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ABSTRACT

Nebraska school districts are advised that they need to prepare for a potential future shortfall in energy, particularly in liquid fuels. This document was written as a guide for planning and policy development concerning energy emergencies in the schools. Energy emergencies are divided into three categories. A phase 1 emergency would be a shortfall of less than 10 percent; phase 2 involves an energy shortfall of 10-20 percent for a particular type of fuel; and a phase 3 emergency would be declared when a shortfall of greater than 20 percent occurs. Items are recommended for inclusion in contingency plans for each type of emergency. Guidelines are also presented for cases in which part or all of a school building is closed; the guidelines include shutdown procedures for maintaining buildings at a minimum temperature during possible winter closures. (Author/MLF)

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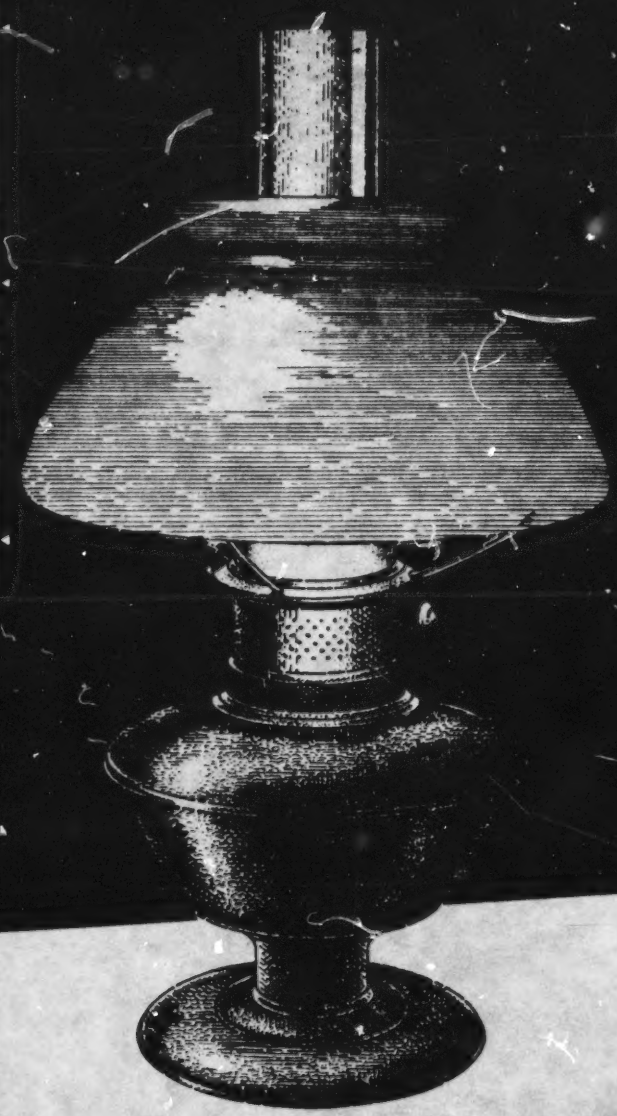

Emergency Energy Guidelines for Nebraska School Districts

EA 014 963

Emergency Energy Guidelines for Nebraska School Districts

Issued by

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Foreword

This "Emergency Guidelines for Nebraska School Districts" document results from a cooperative effort of staff members in the Nebraska Energy Office and the Nebraska State Department of Education.

It is the intent of this document to encourage school officials to establish, make known and keep on file an energy shortfall plan within their own districts. Further, it provides helpful suggestions as to what to take into consideration in the establishment of such a plan. Finally, it discusses what measures will be considered for school districts if an energy shortfall of greater than 20% should occur.

We congratulate all Nebraska school administrators and their staff in the initiative they have taken to reduce energy consumption and costs. Our budget figures show that the 1979-80 school year demonstrated the least percentage increase in school plant energy costs over the past nine years. This fact coupled with the escalating price of fuel and electricity over the same period of time is a definite indicator that a conscious effort is in place. We hope that the suggestions in this publication will assist you in the continuation of this effort.

Nebraska school officials are encouraged to continue to avail themselves of the services of the Nebraska Energy Office and the State Department of Education in regards to energy conservation. A continuation of this cooperative spirit will help in making further gains in the task of diminishing our dependence on foreign oil imports and controlling the amount of tax dollars spent for energy in schools.

Anne Campbell
Commissioner of Education
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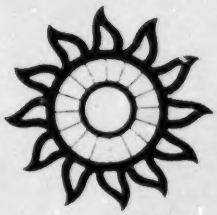


This document was written as a guide for planning and policy development concerning energy emergencies in the schools. It is realized that many of the school districts are already conserving energy in their facilities, and they are to be commended for their efforts.

Introduction

The declining availability and rising costs of energy are a growing concern for all. After almost eight years, since the 1973-74 Arab Oil Embargo, and after an intense analysis among many people representing the technical disciplines and those of many different political persuasions, there is a general consensus concerning the nature of the U.S. energy challenge: because of a reliance on liquid fuels, which are still supplied in large proportions from foreign sources, schools and all sectors of the consuming public need to prepare for a potential future shortfall. As a result, many schools in the state of Nebraska have started or implemented an energy management plan in their district.

For those districts that have not done so, we highly recommend that you look at the energy consumption on your campus and initiate an energy management plan. If you need additional information concerning this component, please feel free to contact the Nebraska Energy Office, Box 95085, Lincoln, NE (402-471-2867) for suggestions that might be of help. The NEO has several excellent general energy management publications that are available at no cost.

An Energy Management Plan should include all items that can be performed to reduce energy consumption in the physical facility, as well as in the transportation component of the individual school district. The purpose of this document, however, is to provide a shopping list of emergency measures that a school may wish to implement if a major emergency supply were to arise. It must be remembered at all times that, when a shortfall exceeds 10% of expected supply, close cooperation and information exchange must be maintained with *all* energy suppliers.

One item that needs to be established, prior to any energy shortfall, is a current inventory of school buildings by energy types, degree of energy use and purpose of energy use. It is very probable that a given energy emergency will place different school buildings on different levels of reduction measures. For instance, a required 30% reduction in electrical energy use will place very different constraints on an all electric school than on a fuel oil heated school. Therefore, a determination needs to be made beforehand as to which level each school would fall into under varying types and degrees of energy curtailment.

The Governor, as a result of legislation passed in 1980, has the authority to mandate certain actions in both public and private sectors for the curtailment of any energy use in the state of Nebraska. It is the intention of the state of Nebraska (at this point in time) not to implement any of these actions until the severity of the situation warrants no other alternative. It is hoped that individual schools, citizens, and private industry on a voluntary basis will be able to curtail their energy use to such an extent that mandatory measures will not have to be implemented. (See Appendix I for Section 84-166[4] RSN1980.) This plan is part of the total energy emergency planning currently being undertaken. The result will be a series of plans for schools, businesses and industries that assist each in coping with a potential energy shortage.

The NEO has divided energy emergencies into three categories. The first of these, a Phase I emergency, would be a shortfall of less than 10%. In this setting, all Nebraskans will be encouraged to reduce on a voluntary individual basis the energy each consumes. In a less than 10% shortfall, school districts should have sufficient fuel to continue operating at a relatively normal level. If the

shortfall starts to approach 10%, the individual district needs to be contacting the respective energy suppliers to determine the potential supply of energy that may or may not be available. A Phase II, energy emergency involves an energy shortfall of 10-20% for a particular fuel type. Finally, a Phase III emergency is declared when a shortfall of greater than 20% arises. (See Nebraska Energy Emergency Preparedness Plan for details.)

A Phase II emergency will only be declared when a serious shortfall exists or is imminent. It is anticipated that these actions will be voluntary at first. If the situation becomes worse and the shortfall approaches 20%, some actions may become mandatory. The prime factor here will be the level of voluntary response to curtail use of the energy type (electricity, natural gas, fuel oil, gasoline, etc.) that is in short supply.

Among the items recommended that might be included in a Phase II Emergency Contingency Plan, (which would be a shortfall of at least 10%,) would be the following:

1. Kitchens to provide only cold lunches or breakfasts;

2. Reduce site prepared lunches; use prepackaged cold lunches;

3. Limit all extra-curricular air conditioned, heated and lighted events;

4. Limit all after hours use of the school building;

5. Reduce thermostat setting of the school building to 50° during evenings, weekends, and holidays when unoccupied;

6. Turn on heating and/or air conditioning systems one hour before the beginning of school, unless the 78° cooling level cannot be met or the 65° heating level cannot be met. Turn off heating and/or air conditioning unit one hour before ending unless 78° cooling level or 65° heating level cannot be met;

7. Set thermostats at 78-80° for cooling; 65-68° for heating;

8. Reduce lighting to a maximum of 50 footcandles in all areas (This should already be done for most areas anyway);

9. Eliminate hot water showers; and

10. Reduce outside air ventilation by duty-cycling or turning off fans. Set mixing dampers to use minimum fresh air. Operate exhaust fans only when necessary.

In the transportation area:

1. Match bus size to the number of students to be transported. Encourage use of larger buses where feasible and establish a minimum number of students per bus; and

2. Eliminate transportation of less than 4 miles. Encourage students to walk;

3. Limit all out-of-town extra-curricular events;

4. Increase distance between school bus stops. Decrease number of pickup points;

5. Restrict out-of-school district travel; curtail in-school district travel; and

6. Transport school personnel on school buses when seats are available.

Calendar instruction:

1. Restrict driver education to the classroom;

2. Establish a plan for a four day school week with extended hours for possible implementation during Phase III;

3. Establish a plan to waive 180 day rule of 300 minute day, and plan for a 250 minute day. (Hold FTE harmless) Make appropriate staff contract arrangements for possible implementation during Pase III;

4. Consolidate programs to central facilities;

5. Curtail adult community education classes to buildings where energy efficiency is higher, and limit summer and adult school to compensatory promotions programs (high school equivalency);

6. Schedule vacations so entire building can be closed. Schedule closing during periods of high energy needs;

7. Provide all staff with in-service training on energy emergency procedures; and

8. Place increasing emphasis on energy conservation as a part of the instructional program.

9. Establish comprehensive high schools where applicable;

Phase III

All Phase III actions may require a mandate from the Governor, with possible legislative or court approval. They are options that will be considered by the Governor only during a serious energy emergency of greater than a 20% shortfall. These items will be done in addition to and in conjunction with all of the applicable items in Phase II.

Facilities:

1. Reduce lighting levels by removing fluorescent tubes where possible. Turn off lights (except high-intensity discharge lamps) whenever they are not being used. Consolidate activities which require large amounts of electricity for light (such as gym classes). Use natural lighting as much as possible (for example: hallways).

2. Reduce ventilation by turning off all fans when they are not necessary to maintain a safe, livable environment. Shorten duty cycling on fans. Seal outside air dampers of unit-ventilator systems.

3. Eliminate air conditioning in schools with operational windows.

4. Maintain thermostat setting at a maximum of 65° Farenheit in all buildings. Reduce further where possible.

Transportation:

1. Eliminate all transported field trips;

2. Suspend court ordered busing for desegregation.

Calendar Instruction:

1. Declare a four day school week;

2. Reduce the instructional day to a maximum of 250 minutes;

3. Eliminate all adult and community school programs;

4. Eliminate all energy intensive instructional activities;

5. Eliminate summer school programs;

6. Centralize in-service programs, student instruction and use ITV with group leaders; and

7. Establish a hold harmless on all FTE funds for higher education institutions and state aid to public schools.

These and other actions may be necessary. Individual schools and Boards should look at their policies and are encouraged by both the State Department of Education and the Nebraska Energy Office to design their own individual energy emergency plans should such a situation warrant the activating of any of the measures.

Schools in Nebraska should remember that as of January 28, 1981, all federal controls on liquid fuels were decontrolled. There no longer exists any state "set aside" to provide additional distillate, residual fuel oils, or gasoline (that can be called upon from the state of Nebraska) to aid a district in an emergency situation. Therefore, schools should make the necessary preparations to handle both the energy component, and the increased cost component, so that they will be able to function at least on a minimum level for as long as possible.

It should be iterated that these are not meant to be all-inclusive for every individual school. We may find that there are other activities that can be implemented to save equal amounts of energy for a fuel type in short supply. Our schools should be aware that sometime during the 1980s it is quite possible that a major shortfall could arise in this state. That would require schools to implement all or a portion of the energy emergency plans set up for their respective school districts.

School Closings

Although Nebraska schools are making conscientious efforts to conserve energy, some schools may be forced to close for part of the school year (depending on the extent of the energy shortage). The effectiveness of measures being taken to minimize an energy shortage is still not completely known. The variables of supply, demand, and priority form infinite possibilities, each set of which will require its own degree of adjustment.

Operation within this uncertainty will require each school system to have a plan for each building in the district. This plan should include measures for keeping the building open as long as possible and for minimizing damage and interruption if it becomes necessary to close the building. Priorities and procedures should be established early so that schools can move immediately into contigency plans if fuel allotments are reduced or disrupted. Any decision to close should be based upon the cooperative actions of the board of education, superintedent, representatives of school employee organizations, parents, etc.

If it becomes impossible to complete the school year, alternative plans should be effected. These might include:[1]

1. Closing the more expendable parts of buildings and increasing the occupancy of heated rooms;
2. Curtailment or elimination of after-school and weekend use of school buildings;
3. Cancellation of community service activities;
4. An inventory of space in other community or private buildings which could be made available for classes; and
5. Maximum use of school buildings which have sufficient fuel.

If present knowledge of the building's fuel allocation indicates a probable shortage, it is advisable to calculate the length of time the building can be kept in operation. This can be effected with fuel conservation measures that still leave a fuel reserve sufficient to maintain the building's interior temperature above freezing until additional fuel can be obtained. Mechnical engineers and utility company representatives can be of assistance in formulating these calculations.

Should closure become a reality, and fuel is sufficient to maintain above-freezing temperature, the following steps should be taken:

Set all thermostats at 40 degrees F. This low setting will save considerable amounts of fuel and prevent freezing (as long as water pipes are away from exterior walls);

Seal all exhaust openings and outside air intakes;

Open all access panels, doors and cabinets to minimize the possibility of freeze-ups in enclosed spaces.

Monitor temperatures throughout buildings during subfreezing outside temperatures;

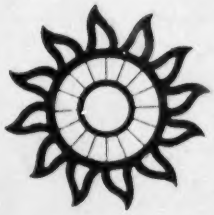
Turn off the heat for domestic hot water but continue to operate the portable water circulating pumps; and

Remove all laboratory chemicals, fluids, other supplies (which would be affected by 40 degree F temperatures), perishable food and all plants and animals. Consider exceptions for chemicals that are unsafe to tansport and expendable items that do not warrant the expense of packing, hauling, storing and returning.

Even if it is possible to maintain a 40 to 50 degree temperature inside a closed building for the duration of the heating season, some damage from freezing may be sustained because few systems heat all parts of the building evenly. Older buildings are particularly vulnerable since they are more apt to have pipes located in the floors or on the outside walls. Therefore, shutdown procedures should be considered even when above-freezing temperatures can be maintained indoors.[2]

[1]Guidelines developed by Ohio Department of Education.

[2]Ibid.



Complete shutdown of fuel supply should be prevented if at all possible. Such a measure involves extensive precautions against damage from freezing with no assurance of complete protection. It also entails a lengthy and expensive procedure to put the building back in operation. Individual school buildings vary so widely that no single set of procedural guidelines can be considered applicable.

Despite all efforts to conserve fuel and plan for emergencies, some schools may exhaust their fuel allotment and be forced to shut down. If such a move must be contemplated, consideration should be given to using auxiliary heating equipment, such as electric space heaters, to maintain above-freezing temperatures inside the closed building. Where this is not feasible, complete shutdown procedures must be implemented.

In the case of a complete shutdown, services of consultants such as mechanical engineers, utility company personnel, and heating and plumbing contractors should be considered.

The following guidelines are presented only as an example of the range of items to be dealt with. Each building will have individual requirements, some of which may not be covered in these listings.

1. Total shutdown of all systems requires the complete drainage of all systems containing water. All lines that are not 30 inches or more below grade or ground level should be completely drained;
2. Turn off fuel supply at the meter;
3. Gas or oil-fired furnaces should be turned off according to manufacturer's directions;
4. All auxiliary heating equipment should be turned off;
5. Hot water, (heating systems) supply and return piping, plus

The following is a partial list of items that would be damaged by freezing temperatures:

acids
ammonia
antiseptics
baking powder
baking soda
belt dressings
boiler compounds
brass polishes
bug sprays
canned goods
caulking compounds
cement
clay
cleaning compounds
correction fluid
disinfectants
distilled water
drain cleaner
electric batteries
electric tubes
enamel
eradicator inks
glue
insecticides
lacquers
liquid cement
liquid polishes
liquid soap
paints
patching compounds
photographic developer
shellac
thermometers
thinners
varnish removers
waxes, floor finishes

equipment such as radiators, pumps, valves, expansion tanks and boilers must be drained;

6. Drain steam and condensate piping. This should include all valves, traps, radiators, condensate receivers, pumps, steam coils, steam tables and steam humidifiers;

7. Drain boilers and auxiliary equipment such as deaerators, feed water pumps, expansion tanks, condensate tanks, piping valves, control valves and tanks, per manufacturer's recommendations;

8. Drain radiators on emergency generators that are water cooled and have not been protected with anti-freeze;

9. Drain chilled water (air conditioning) supply and return piping and all equipment such as heat exchangers, chiller unit and expansion tanks.[3]

10. Cooling water (cooling tower) supply and return piping and all equipment; and

11. Turn off water at the street valve.

Water systems to be drained:

1. Sanitary sewer piping, especially traps and water closets;

2. Storm sewers: make sure they are kept clean at all times so they can drain properly;

3. Drinking water;

4. Hot water piping (domestic) supply and return equipment;

5. Floor drains;

6. Tie air compressor into hot and cold water lines at high point;

7. Drain hot water tanks under pressure;

8. Close both valves on domestic water pressure regulator, break union and use bypass while under air pressure;

9. Drain all apparatus used to make, convey or store such liquid as demineralized or distilled water used in laboratories;

10. Remove electrically cooled drinking fountains from wall, empty drain, fill with anti-freeze, store coolers in heated area or blow out holding tank (approximately 1½ gallons of water);

11. If water meter is inside of building, remove. Pump down supply side to below freeze line; store meter in heated area or blow out. Do not damage from over pressure;

12. Drain swimming pool when pool reaches 35 degrees F. Follow dealer's direction in draining all pool equipment;

13. Some electrical light circuits should be left open for convenience and security, but main switches for equipment should be turned off to prevent operation of any equipment;

14. Refrigerator doors should be removed or propped securely open with handles removed;

15. All ventilation dampers, interior vents and doors of rooms and closets should be secured in an open position to provide adequate ventillation. Access panels, cabinet doors and some ceiling tiles should also be opened to equalize temperatures in enclosed spaces. (Paint, other finishes, and furnishings will be damaged by condensation if inside temperatures are allowed to vary greatly from outside temperatures);[4]

16. In general, all operable windows, doors, and accessways should be securely fastened;

17. Roof exhausts, chimneys, and other non-watertight vents should likewise be closed or sealed. Room air conditioners should be covered and outside intakes sealed;

18. Fire extinguishers should be serviced to operate in freezing temperatures;

19. For wet sprinkler piping, drain all piping heads, risers, deluge valves, inside hydrants, and valves. Notify local fire departments. Keep alarm systems in operation;

20. For dry sprinkler systems, check with fire department authorities and drain all exposed piping at supply or deluge valves;

21. Chemicals or solutions in laboratories should be removed or protected from freezing;

[3]Ibid.

[4]Ibid.

22. Canned foods in kitchens should be removed;

23. Cleaning solutions, paints and inks should be protected from freezing. Likewise, any vegetation, as plants in pots or planters, must be removed to prevent freezing;

24. For reasons of safety, gasoline-powered equipment, such as lawn mowers, should be drained of oil and gasoline; and

25. Bleed all air lines, drain traps and especially drain air tank receiver. (Humidity condenses in tank and water accumulates in receiver.)

The above guidelines are not all applicable to any one school; individual schools or buildings require a definite guide which may be derived from the above list. Extreme care must be taken to reverse the above processes when the systems are placed into operation. Again, it is recommended that competent craftsmen perform the operations for start-up as well as shutdown.

The following guidelines on shutdown procedures come from the Ohio Association of School Business Officials. The guidelines are intended for consideration in the event that conditions dictate a closing of buildings during the winter months.[5]

[5]Ibid.

Shutdown Procedures To Maintain Buildings At A Minimum Temperature

I. Potential Problem Areas

1. Bells, horns and buzzers if not turned off at the Master Clock;
2. Security alarms;
3. Fire alarms and smoke detectors;
4. Freeze ups;
5. Plumbing lines in exterior walls if not drained;
6. Outside air exhaust air grills if not covered;
7. Electric motors;
8. Sump pump;
9. Freezer and refrigerator;
10. Data processing and other electronic equipment;
11. Fire extinguisher freeze ups;
12. Vandalism.

II. Shutdown Procedures Prior to Closing:

1. Clean total building;
2. Turn off all argon, oxygen and propane valves;
3. Shut off gas to educational and food service equipment, e.g., lab tables, stoves, etc.;
4. Hot water heaters should remain on (set temperature back to 100 degrees);
5. Hot water circulation pumps should remain on;
6. Vending machines should remain on, but contents should be removed;
7. Air compressors should be turned off and drained;
8. Close and lock all exterior doors; install chains and locks (make very tight) on all doors except the one entrance door;
9. Open classroom doors;
10. Close all windows and lock; re-check every window to be certain that it is locked;
11. Deliver extra replacement windows, window boards, bolts and locking strips to the building;
12. Close all window drapes, shades and blinds;
13. Turn off all lights except interior security lights;
14. All electric breaker panel doors should be left open;
15. In hot water heated buildings the circulating pump should be left on;
16. In electric heated buildings the radiant heat should be left on;
17. Check all back draft dampers to be sure they close properly;
18. Check attic dampers to be sure they close properly;
19. Remove all waste and garbage from building;
20. Turn on the security system upon leaving, if applicable;
21. Review security procedures to prevent unauthorized entry;
22. Reduce food inventory;
23. Remove all perishables that will not keep in excess of 30 days;
24. Remove pets, plants, fish, etc. from building;
25. Remove all money from the building; and

26. Do not remove telephones unless shutdown is for more than 30 days.[6]

III. Daily Operating Procedures

1. Building operators must call in to a designated official daily;

2. Arrange for daily building checks;

3. Maintain the building temperature so that it will not drop below 40 degrees F. in the coldest area during the next 24 hours;

4. Check the temperature of the freezers and refrigerators. If freezer temperature rises above 20 degrees F. or refrigerator temperature rises above 40 degrees F., report this immediately to the designated official;

5. Check all rooms in the building for temperature, roof leaks, water leaks, fire or vandalism;

6. Complete total vision check of the building exterior;

7. On steam heating systems, after you have shut the boilers down, be sure to operate the vacuum pumps on continuous cycle for a minimum of 15 minutes and then return to the float position;

8. Fill out a vandalism report for each case of vandalism and submit to the designated official;

9. Report all cases of vandalism immediately to the designated official; and

10. Call the designated official for assistance or energy information.

IV. Other Items of Importance:

1. Personnel who are required to work:

Building operator—4 hours per day, 7 days a week;

Recommended time (12:00 noon to 4:00 p.m.);

Emergency maintenance personnel;

Mail services;

Warehouse deliveries;

Payroll;

Data Processing;

Accounts payable;

Supervision;

2. Negotiated agreements;

3. Notify the U.S. Post Office for a change in the mailing address;

4. Notify all vendors to withhold deliveries;

5. Notify truck lines for change in delivery address;

6. Notify United Parcel for change in delivery address;

7. Notify utility companies;

8. Notify all city departments—police, fire, water;

9. Notify security company; and

10. Notify construction contractors who have contracts to complete.[7]

Remember, these lists are not meant to be all inclusive. Each building will have specific items that need to be done to prevent major or minor damages. Each of these can be developed at the local level with the assistance of local engineers and other professionals in the heating and cooling business. Of utmost importance is the need to maintain contact with the various energy suppliers and your local utilities.

The Nebraska Energy Office is ready to help you with any aspect of your emergency contingency plan.

[6]Ibid.

[7]Ibid.

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